

Gas Powered Suction Stop Valve

Product Bulletin 50-23 D

Type: CK-5

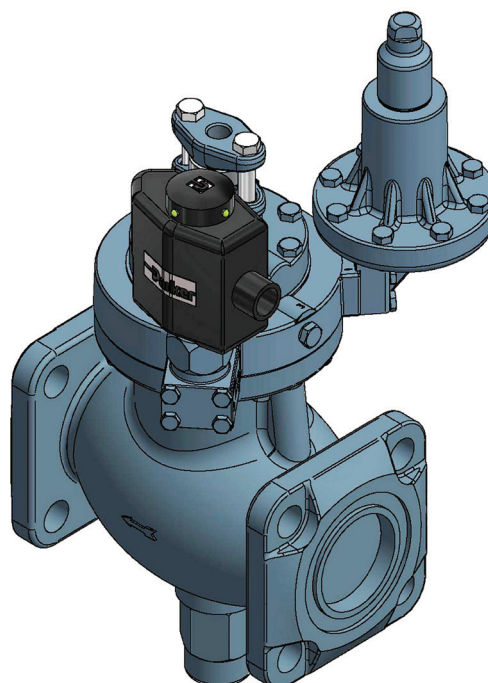


Purpose:

The CK-5 from Parker is a unique piston type gas powered suction stop valve, normally open, with a semi steel body, heavy duty constructed with control precision.

This valve incorporates a built-in mechanical fail-safe feature which prevents the undesirable effects of an immediate opening of the valve in the event of an electrical power failure while the evaporator is in defrost.

CK-5 is typically used for low temperature applications in overfeed or flooded systems, in wet return lines, on the liquid and gas return legs of flooded evaporators.



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Product Features:

- Suitable for Ammonia, R-22, R-134a, R-404A, R-410A, R-507, and Other Common Refrigerants
- Normally Open
- Low Pressure Drop
- Manual Opening Stem
- Integrated Pilot Solenoid on 32mm to 100mm (1-1/4" to 4") sizes
- Use in Vertical or Horizontal Lines
- Valve may be mounted on its side
- Temperature Range: -51 to 104°C (-60 to 220°F)
- Maximum Rated Pressure (MRP): 28 barg (406 psig)
- Minimum Pressure Drop to Close: 0.35 bar (5 psi)



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Technical Data

Body Material:

32 to 100 mm (1-1/4 to 4")	LCB ASTM A-352
125 to 150 mm (5 to 6")	Gray Cast Iron

Seat:

32 mm (1-1/4")	PTFE
40 to 150 mm (1- 5/8 to 6")	Metal

Refrigerant Temperature Range	-51 to 104°C (-60 to 220°F)
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Ambient Temperature Range:

AC Coils	-60 to 60°C (-76 to 140°F)
DC Coils	-25 to 60°C (-13 to 140°F)

Maximum Rated Pressure (MRP)	28 bar (406 psig)
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Minimum Pressure to Open.	0 bar (0 psig)
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Minimum Pressure Above, Inlet Pressure to Close Valve	0.35 bar (5 psig)
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Description

These valves are piston-type, gas powered, and normally open. They are heavy duty, semi-steel bodied valves that are built with control precision.

The 32 mm (1-1/4") port size has a PTFE main seat, the 40mm (1-5/8") port and larger have a metal to metal seat. The 100 mm (5") and 125 mm (6") port size versions of this unique suction stop valve utilize a larger capacity, remotely piped pilot operated solenoid, the Sporlan Division - Refrigeration Business Unit type S8F. In addition, the pilot regulator for these two larger sized valves is mounted on top of valve, with the strainer disc assembly piped into the side of the adapter.

Purpose & Applications

The purpose of the CK-5 is to be used on low temperature applications to positively close wet return lines or on the liquid and gas return legs of flooded evaporators. Because of the spring, no line pressure drop is required to open de valve, it is normally open construction, pressure drop is minimal in suction or wet returns applications; besides normal gravity circulation is unrestricted on flooded evaporators.

Being pressure powered to close, this valve can overcome sticking at low temperatures caused by the presence of viscous oil. In addition, this unique control valve incorporates a built-in mechanical fail-safe feature which prevents the undesirable effect of an immediate opening of the valve in the event of an electrical power failure while the evaporator is in defrost.

CK-5 Valve General Information

Port Size		Flow Coefficient		Connections				Pilot Solenoid	Pressure Pilot	Weight			
				FPT ^[1] , SW, WN		ODS				With Flanges		Less Flanges	
				mm	inch	mm	inch			Kg	Lbs	Kg	Lbs
32	1¼	16	19	32*,40	1-¼*, 1½	40	1⅝	S6B ^[2] /S6A	A2D	15	33	13	29
40	1⅝	32	37	38*,50	1½*, 2	54*,66	2⅞*, 2⅝	S6B ^[2] /S6A	A2D	28	62	25	55
50	2	44	51	40,50*	1½, 2*	54*,66	2⅞*, 2⅝	S6B ^[2] /S6A	A2D	28	62	25	55
65	2½	70	82	65*,80	2½*, 3	66*,80	2⅝⅔*, 3⅞	S6B ^[2] /S6A	A2D	36	79	34	75
75	3	103	120	75	3	80*,92	3⅞*, 3⅝	S6B ^[2] /S6A	A2D	50	110	47	104
100	4	171	200	100	4	105	4⅞	S6B ^[2] /S6A	A2D	74	163	71	157
125	5	244	285	125	5	—		S8F ^[3]	A4	131	289	128	282
150	6	342	400	150	6	—		S8F ^[3]	A4	207	456	204	450

*Standard Connection.

1. FPT Flanges are only available in sizes: 32 to 50 mm (1-1/4 to 2").

2. Valves containing S6B coils can be installed in a vertical or horizontal position.

3. External and independent solenoid.

Parts Description

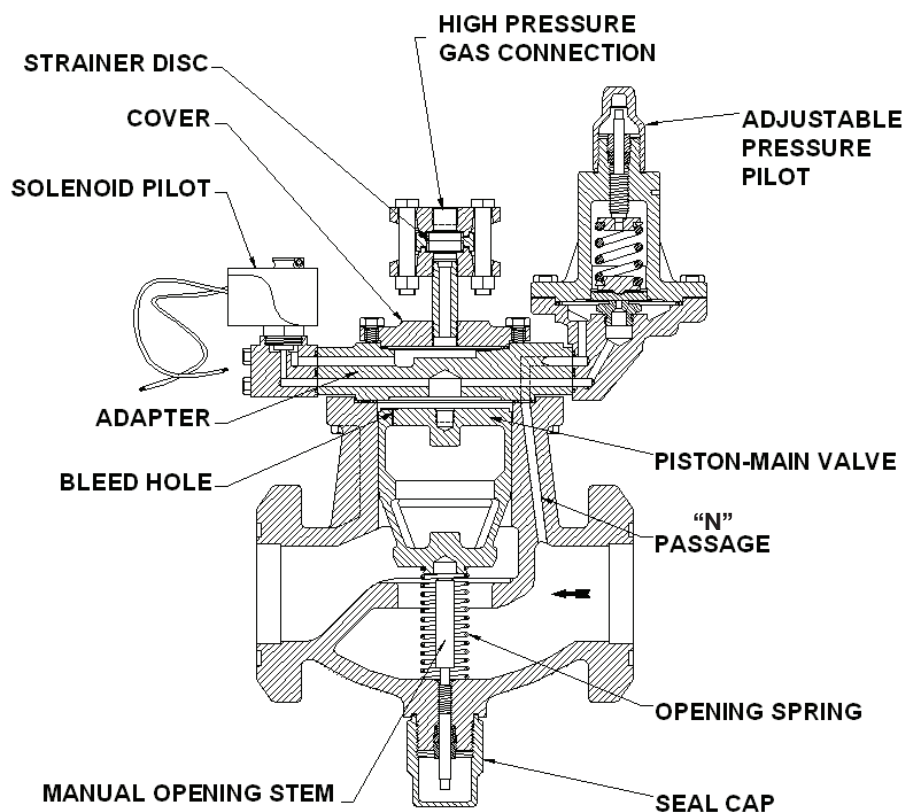


Figure 1: CK-5 Valve Part Descriptions, 32mm to 100mm (1-1/4" to 4") Port Size

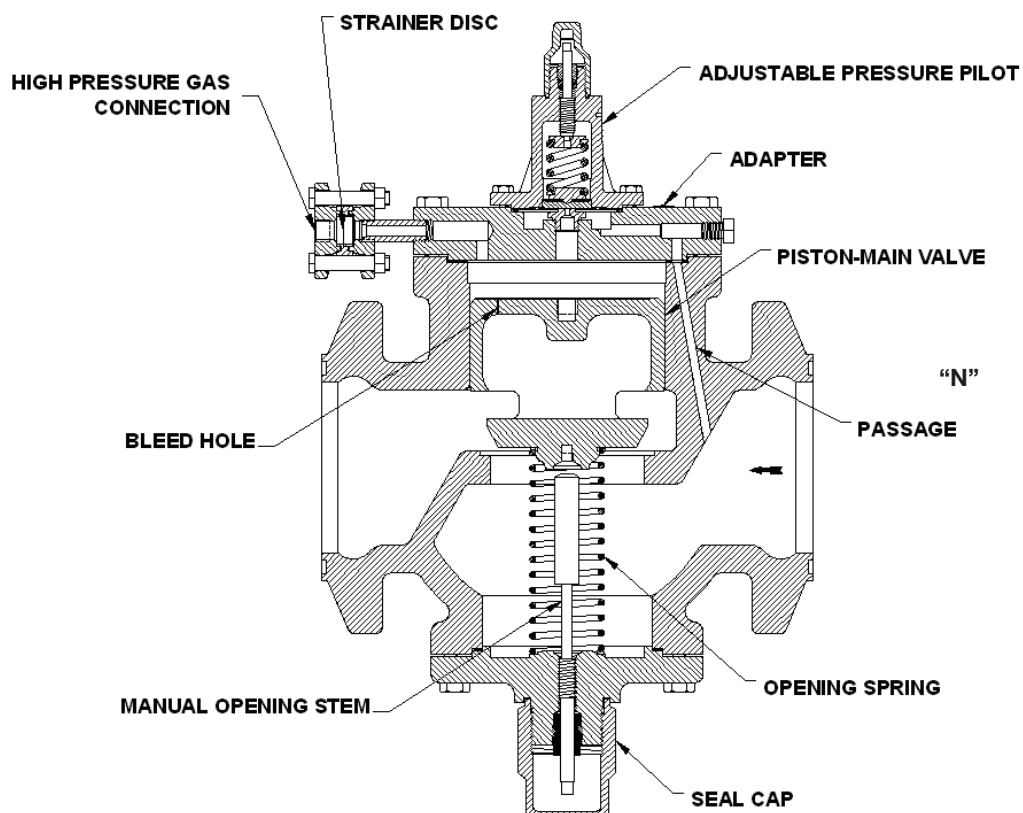


Figure 2: CK-5 Valve Part Descriptions, 125mm to 150mm (5" to 6") Port Size

Principle of Operation

For closing of the CK-5 valve, high pressure gas from an external source is admitted through the pilot solenoid valve to the piston. This gas pressure acts on the piston, forcing it down, compressing the opening spring, firmly seating the valve's seat bead. The valve will not close unless pressure above the piston exceeds the downstream pressure by at least 0.35 bar (5 psig). After the termination of the hot gas injection period, the valve must re-open in order for refrigeration to resume.

For the CK-5 to open, the valve's pilot solenoid de-energizes, thereby interrupting the pilot stream flow of discharge gas to the top of the valve's piston. The main valve will continue to remain closed; however, since residual pressure in the coil is transmitted through passage "N" through the pilot regulator to the top of the piston (See Figure 1 and 2).

NOTE: The pilot regulator should keep or maintain a minimal set point, approximately 0.69 barg (10 psig) above the pressure of the defrost relief or equalizing line.

Under a standard defrost sequence for most low temperature evaporators, a "bleed down" or vent solenoid will energize to slowly equalize pressures between the coil and the suction line. It is imperative to incorporate a "bleed down" solenoid in a defrost group of control valves which includes a CK-5 (See Fig. 5, 6, and 7). Without this gradual equalization period, which generally takes one to two minutes, the CK-5 will stay closed for a prolonged period of time as the coil pressure slowly equalizes in series through the pilot regulator, then through the piston bleed hole.

The ability of the CK-5 to stay closed during an interruption of power, while an evaporator is in the process of defrosting, is its single greatest advantage. Where power failures can occur regularly, consideration should be given to this unique valve. By design, a standard CK-2, or a competitive valve with a similar design, would open immediately as residual coil pressure surges through the valve should power to the pilot solenoid suddenly be interrupted during a defrost. The design of the CK-5 prevents this from occurring and prevents the dangerous consequences to the system under these conditions.

In the event the CK-5 pilot solenoid de-energizes due to a power failure while the evaporator is in defrost, the defrost coil pressure (typically at or about 4.8 barg (70 psig) for ammonia) will continue to be transmitted through passage "N", through the pilot regulator and to the top of the piston. This pilot pressure acts as a "closing" force acting upon the larger effective area of the

top of the piston and will overcome the "opening" force of coil pressure working against the underside of the piston. The valve will therefore remain closed due to the greater closing force until the coil pressure is equalized through the piston bleed hole.

If the defrost relief line is connected to an intermedia pressure/temperature line (higher than the suction line of the particular application), the pressure setting of pressure pilot of the CK-5 needs to be 0.69 barg (10 psig) above the pressure of the defrost relief or equalizing line, otherwise the valve will not open.

The larger the evaporator, and the greater its internal volume, the longer this venting or equalization period will require. By utilizing a bleed down solenoid in the control group during the standard defrost sequence, the CK-5 will return to its open position immediately after the equalizing period which is controlled by the time clock.

Electrical

The pilot solenoids used on CK-5 stop valves, type S6A or S6B, are unique to the Sporlan Division - Refrigeration Business Unit line of control valves. The coils are designed for long life and powerful opening force. The standard coil housing meets special requirements, this sealed construction can withstand direct contact with moisture and ice. For class "H" coil construction will permit coil temperatures, as measured by resistance method, as high as 180°C (356°F). By definition, class "F" coil construction will permit coil temperatures, as measured by resistance method, as high as 155°C (311°F). Final coil temperatures are a function of both fluid and ambient temperatures.

The higher fluid temperatures require lower ambient temperatures so the maximum coil temperature is not exceeded. Conversely, low fluid temperatures permit higher ambient temperatures. A solenoid coil should never be energized except when mounted on its corresponding solenoid tube.

The solenoid coil must be connected to an electrical line with Volts and Hertz the same as stamped on the coil. The supply circuits must be properly sized to give adequate voltage at the coil leads even when other electrical equipment is operating. The coil is designed to operate with line voltage from 85% to 110% of rated coil voltage. Operating with a coil voltage above or below these limits may result in coil burnout. Also, operating with a coil voltage below the limit will definitely result in lowering the valve's maximum opening pressure differential.

CK-5 General Coil Information

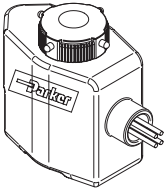
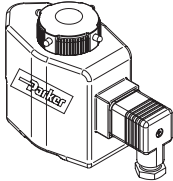
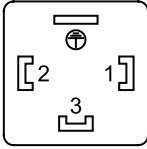
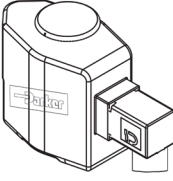
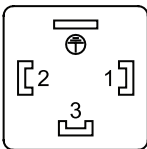
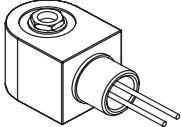
S6B Coils						
Coil (Volts/Hz)	Power Lead	Neutral Lead	Inrush Current (Amps)	Running Current (Amps)	Fuse Size (Amps)	Temp °C (°F)
110-120 /50-60	Black	Green	0.66	0.42	1	180°C (356°F)
208/50	Black	Green	0.35	0.22	1	
220-240 /50-60	Black	Green	0.33	0.21	1	

S6A Coils						
Coil (Volts/Hz)	Power Lead	Neutral Lead	Inrush Current (Amps)	Running Current (Amps)	Fuse Size (Amps)	Temp °C (°F)
24/50	Brown	White	6.82	2.99	4	250 (482)
24/60	Brown	White	6.70	2.73	4	250 (482)
48/50	Brown	White	–	1.07	–	250 (482)
115/50	Purple	White	1.22	0.21	1	90 (194)
120/60	Blue	White	1.18	0.46	1	90 (194)
208/60	Red	White	0.63	0.24	1	90 (194)
230/50	Yellow	White	0.65	0.26	1	90 (194)
240/50	Black	White	0.59	0.24	1	90 (194)
240/60	Orange	White	0.60	0.23	1	98 (208)
12 DC	Brown	White	–	–	–	–
24 DC	Brown	White	6.70	6.70	–	204 (400)
48 DC	Brown	White	–	–	–	–

Notes:

Leaded coils are provided with 18 gauge wires at 914 mm (36") in length.

See current price list ILP- for coil part numbers.

Pilot	Type	Image	Terminal Diagram	Classification	Voltages/ Frequencies	Wattage (Holding)	Certifications
S6A	Leaded		 Start Winding: White Wire End Winding: Black Wire	Class "F" approved system with housing meeting 3R and 4 requirements 18" Leaded Wires NEMA 3R and 4	24 VAC/50 Hz 24 VAC/60 Hz 115 VAC/50 Hz 120 VAC/60 Hz 208 VAC/60 Hz 230 VAC/50 Hz 240 VAC/50 Hz 240 VAC/60 Hz 12 VDC ^[1] 24 VDC ^[1]	– – 34.0 34.0 32.5 32.5 35.0 37.5 – 32	CSA UL ^[2]
	DIN QD		 Terminal 1- Power Terminal 2- Electrical Neutral	Class "F" approved system with housing meeting 3R and 4 requirements NEMA 3R and 4 IP65	24 VAC/50 Hz 48 VAC/50 Hz 115 VAC/50 Hz 230 VAC/50 Hz 240 VAC/50 Hz	– 42.5 N/A 34.5 30.0	CSA CE UL ^[2]
			 Terminal 1- Power Terminal 2- Electrical Neutral	Class "F" approved system with housing meeting 3R and 4 requirements NEMA 3R and 4	24 VAC/60 Hz 120 VAC/60 Hz 240 VAC/60 Hz 24 VDC ^[1] 48 VDC ^[1]	– 35.5 37.5 32.0 42.5	CSA UL ^[2]
S6B	Leaded		 Start Winding: White Wire End Winding: Black Wire	Standard Molded Class "H" #18 AWG 18" Leaded Wires NEMA 3R and 4	110/120 VAC 50/60 Hz 208 VAC 60 Hz 220-240 VAC 50/60 Hz	18.5 W	CE

Notes:

- Consult factory for other voltages/frequencies.

- See current price list ILP- for coil part numbers.

- Optional LED pilot light knob kit (green or red) that indicates when the coil is energized. LED knob kits can be used with 115 to 240 Volts AC coils only.

[1] DC coils are limited to an ambient temperature of -25°C to 60°C (-13°F to 140°F).

[2] Only on approved coils.

Explosion View & Material List

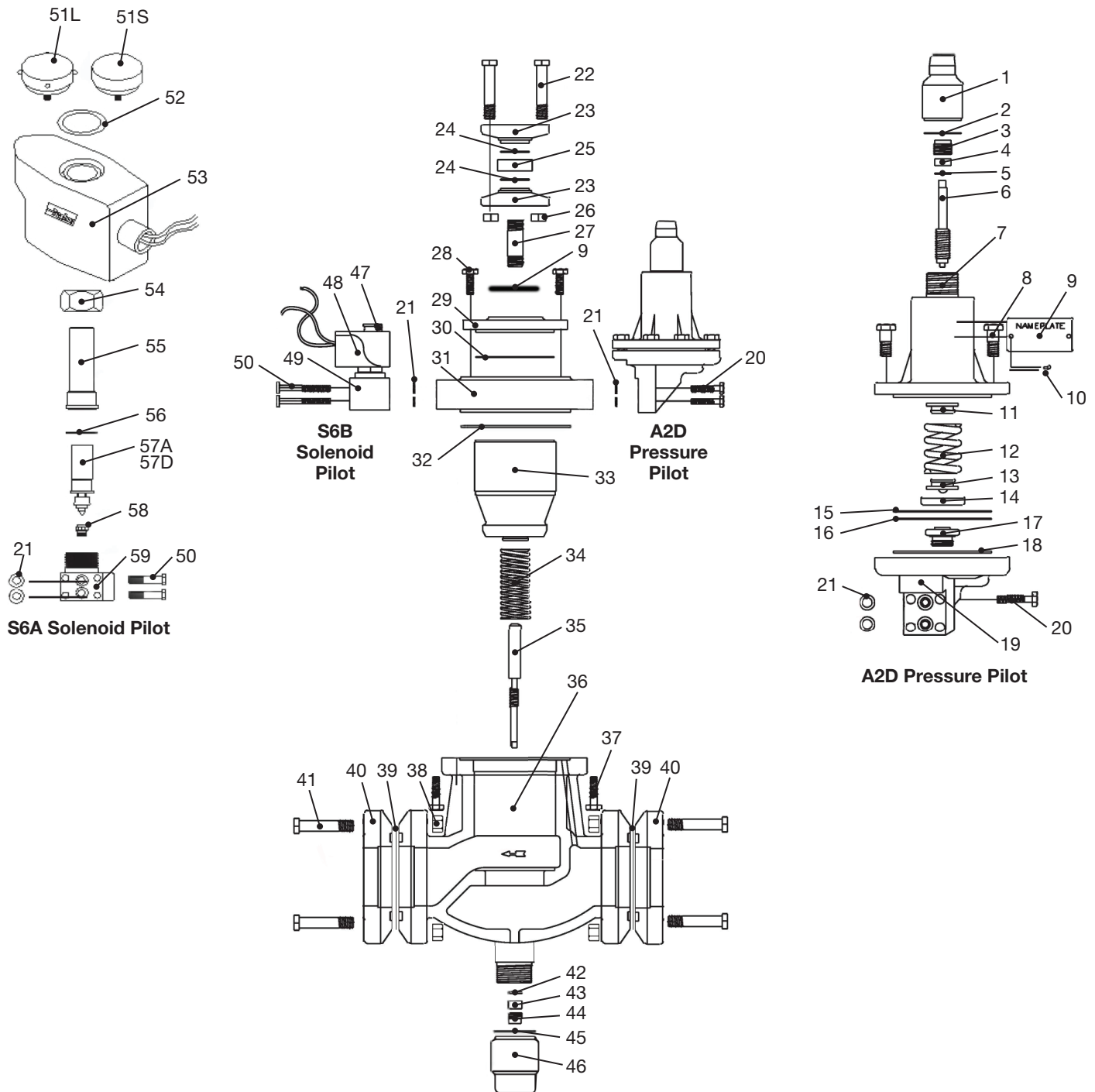


Figure 3: Explosion View CK-5 Gas Powered Suction Stop Valve 32 to 100mm (1-1/4 to 4") Port Size

CK-5 32 to 100mm (1-1/4 to 4") Material List

Item	Description	Material	Qty
1	Seal Cap, A2D	Aluminum 2011-T3	1
2	Gasket, Seal Cap, A2D	Nylon	1
3	Nut, Packing, A2D	303 S.S.	1
4	Packing, Stem, A2D	Crane Foil	1
5	Washer, Packing, A2D	Teflon, Carbon	1
6	Stem, Pressure Pilot, A2D	303 S.S.	1
7	Bonnet, A2D	Cast Iron	1
8	Screw, Pressure Pilot, A2D	Steel Grade 5 Zinc	8
9	Nameplate, A2D	Aluminum	1
10	Bolt, Name Plate, A2D	Stl. Zinc Plated	2
11	Plate, Spring, Upper, A2D	Carbon Steel	1
12	Spring, Range A, A2D	ASTM A401	1
13	Plate, Spring, Lower, A2D	Carbon Steel	1
14	Follower, Diaphragm, A2D	Carbon Steel	1
15	Gasket, Diaphragm, A2D	Garlock 2930 Non-asbestos	1
16	Diaphragm, A2D	Stainless Steel	1
17	Seat, A2D	303SS ASTM A582	1
18	Gasket, Bonnet, A2D	Garlock 2930 Non-asbestos	1
19	Body base, A2D	Cast Iron	1
20	Bolt,A2D HEX HD 1/4" - 20 x 1-1/4" L	Steel Grade 5 Zinc	4
21	O-ring, A2D	Neoprene	2
22	Bolt, Disc Strainer 7/16" - 14 x 2- 1/2" L	Steel Grade 5 Zinc	2
23	Flange, Disc Strainer	ASTM A-105	2
24	Gasket, Disc Strainer	Garlock 2930 Non-asbestos	2
25	Strainer, Disc, 60 mesh	Carbon 1213/1215	1
26	Nut, Disc Strainer	416 SS	2
27	Pipe, Nipple 3/8" x 2L, Disc Strainer	1117 Steel	1
28	Screw, Adapter, CK-5	Steel Grade 5 Zinc	8
29	Cover, Top, CK-5	Ductile Iron	1
30	Gasket, Cover, CK-5	Garlock 2930 Non-asbestos	1
31	Adapter, CK-5	Cast Iron	1
32	Gasket, Adapter, CK-5	Garlock 2930 Non-asbestos	1
33	Piston, Plug, CK-5	Ductile Iron ASTM A-536	1
34	Spring, Manual Opening, CK-5	ASTM A229	1
35	Stem, Manual Opening, CK-5	416 SS	1
36	Body CK-5	LCB ASTM A-352	1
37	Screw, Bottom Cover, CK-5	Steel Grade 5 Zinc	8
38	Nut Flange, CK-5 Body 32 to 50 mm (1-1/4 to 2") 5/8" - 11	Steel	8
	Nut Flange, CK-5 Body 65 to 75 mm (2-1/2 to 3") 3/4" - 10		
	Nut Flange, CK-5 Body 100 mm (4") 7/8" - 9		
39	Gasket, Flange, CK-5	Garlock 2930 Non-asbestos	2
40	Male Flange, CK-5 Body 32 to 100 mm (1-1/4 to 4")	ASTM A-105	2

Item	Description	Material	Qty
41	Bolt Flange, CK-5 Body 32 mm (1-1/4") SQ HD 5/8" - 11 X 2-3/4"L	ASTM A 307 GR A ZINC	8
	Bolt Flange, CK-5 Body, 40 to 50 mm (1-5/8 to 2") BLT, SQ HD 5/8" - 11 X 3-1/4"L		
	Bolt Flange, CK-5 Body, 65 to 75 mm (2-1/2 to 3") BLT, SQ HD 3/4" - 10 X 3-3/4"L		
	Bolt Flange, CK-5 Body, 100 mm (4") BLT, SQ HD 7/8"- 9 X 4-1/2"L		
42	Washer, Flat, CK-5	Soft AISI 1010 Carbon Steel	1
43	Packing, Stem, CK-5	ASTM F2168	1
44	Nut, Packing, CK-5	416 SS	1
45	Gasket, Seal Cap Bottom, CK-5	Nylon	1
46	Seal Cap, CK-5	Aluminum 2011-T3	1
47	Clip Retainer for S6B Coil Solenoid Pilot	Spring Steel	1
48	Coil for S6B Solenoid Pilot	Standard Molded Class H	1
49	Body, S6B Solenoid Pilot	AISI 1214 steel	1
50	Bolt, S6A/S6B Solenoid Pilot HEX HD 1/4" - 20 x 2-1/4" L	Steel Grade 5 Zinc	4
51L	LED Knob Kit, S6A Coil, Solenoid Pilot	-	1
51S	Standard Knob Kit, S6A Coil, Solenoid Pilot	-	1
52	O-ring, S6A Coil Solenoid Pilot	Ethylene Propylene	1
53	Coil for S6A Solenoid Pilot	Encapsulated	1
54	Nut, Solenoid Tube, S6A Solenoid Pilot	Steel AISI 1010 or AISI 12L14	1
55	Solenoid Tube S6A, VAC Coil, Solenoid Pilot	304 S.S.	1
56	Gasket, Tube S6A, Solenoid Pilot	Wolverine	1
57A	Plunger/Needle Assembly S6A, VAC Coil	Silicon Iron B Steel	1
57D	Plunger/Needle Assembly S6A, VDC Coil	Silicon Iron B Steel	1
58	Seat Assembly, S6A Solenoid Pilot	416 S.S. ASTM A484	1
59	Body, S6A Solenoid Pilot	ASTM A536	1

CK-5 32 to 100mm (1-1/4 to 4") Replacement Part Kits

Item	Kit Description		Port Size					
			32 mm (1¼")	40 mm (1⅝")	50 mm (2")	65 mm (2½")	75 mm (3")	100 mm (4")
1, 2	Seal Cap Kit, Pressure Pilot A2D		202110					
2 (12)	Gasket Pkg, Seal Cap Pressure Pilot		202408					
3-5	Packing Kit, Stem Pressure Pilot		202100					
4 (25)	Stem Packing, Pkg. Pressure Pilot		202478					
4-6	Stem Kit, Pressure Pilot A2D		202120					
8 (8)	Bolt Pkg. Kit, Bonnet Pressure Pilot A2D		202246					
3-6, 11-14	Spring/Stem Kit, Range A, Pressure Pilot		202006					
11-13, 15	Spring Kit, Range A, Pressure Pilot		202481					
15, 16, 18	Diaphragm Kit, Pressure Pilot A2D		200770					
15-18	Seat/Diaphragm Kit, Pressure Pilot		202001					
20 (4), 21 (2)	Bolt/O-ring Kit, Pressure Pilot A2D		201572					
21 (12)	O-ring Pkg, Pressure Pilot		202424					
1-21	Complete Modular Pressure Pilot A2D, Range A		201675					
21 (2), 50 (4)	Bolt/O-ring Kit, S6A or S6B Solenoid Pilot		201574					
22 (2), 26 (2)	Bolts and Nuts, for Disc Strainer		201580					
24 (2), 25	Strainer Kit, Disc		200912					
22-27	Strainer Kit, Disc with Flanges, Bolts, Nuts, and Gaskets	10mm (3/8") FPT	201665					
		10mm (3/8") SW	201704					
		13mm (½") FPT	201706					
		13mm (½") SW	201707					
		20mm (¾") SW	201710					
28 (8), 29, 30	Cover Kit, CK-5		204701					
30-32	Adapter Kit, CK-5		204702	204703		204704	204705	204706
30, 32	Gasket Kit, Adapter CK-5		Consult factory					
32-33	Piston Kit, CK-5		204750	204749	204757	204756	204755	204760
34	Spring Kit, CK-5		301528	301490		301494	301505	301500
35, 42-44	Stem Kit, CK-5		201514	201133		201118	201216	251123
37 (8)	Bolt, Adapter CK-5		202248					
38 (4), 39 (1), 41 (4)	Union Kit per Flange CK-5		206215	206516		206217	206218	206219
38 (8), 41(8)	Bolts and Nuts Pkg. Flanges per CK-5 Valve		201595	201604		201614		206052
39 (12)	Gasket Kit, Flange CK-5		202080	202081		202082	202083	202084
40 (2)	Flange, CK-5 Body	FPT	200030	200039	200040	—	—	—
		SW	200032	200041	200042	200049	200054	200063
		WN	200034	200043	200044	200050	200055	200064
42-44	Packing Kit, Manual Opening Stem CK-5		202100				202101	
45-46	Cap Kit, CK-5		202110			202144	202111	

CK-5 32 to 100mm (1-1/4 to 4") Replacement Part Kits (Cont.)

Item	Kit Description		Port Size					
			32 mm (1¼")	40 mm (1⅝")	50 mm (2")	65 mm (2½")	75 mm (3")	100 mm (4")
47 (12)	Clip Retainer for S6B Coil, Kit		206516					
48	Coil, S6B, Solenoid Pilot		Refers to current price list ILP- to get the coil part number according to voltage and frequency					
21 (2), 49, 50 (4)	Modular Solenoid Pilot, S6B		205073					
51S, 52	Standard Knob Kit, S6A Solenoid Pilot (no LED)		205237					
51L, 52	LED Knob Kit, S6A Solenoid Pilot	Green	208543					
		Red	208544					
53	Coil, S6A Solenoid Pilot		Refers to current price list ILP- to get the coil part number according to voltage and frequency					
54-56	Tube Kit, Solenoid S6A		209320					
56, 57A, 58	Plunger Seat Kit, S6A VAC		201630					
56, 57D, 58	Plunger Seat Kit, S6A VDC		202102					
21 (2), 50 (4), 54-59	Modular Solenoid Pilot, S6A VAC		251138					

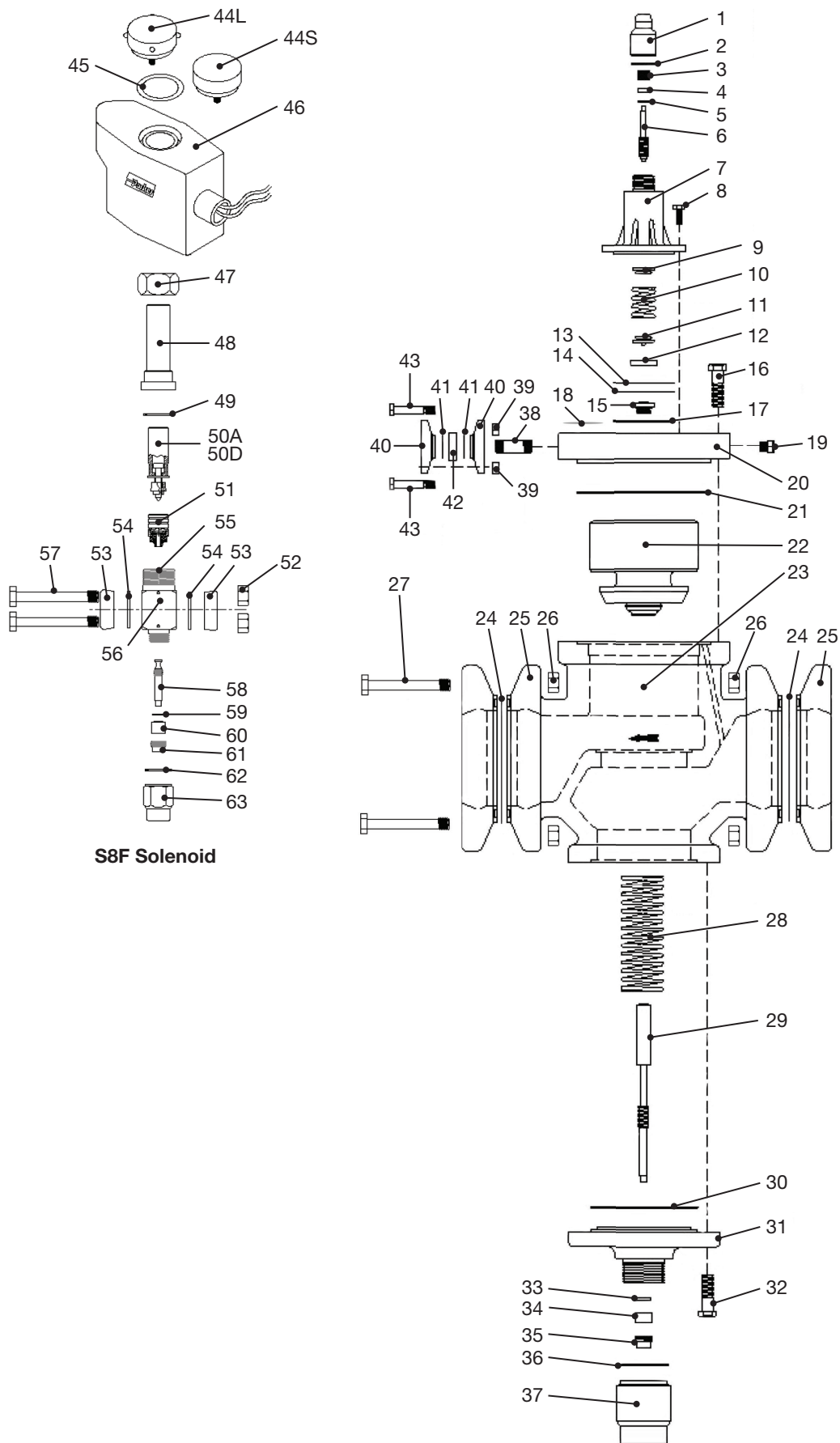


Figure 4: Explosion View CK-5 Gas Powered Suction Stop Valve 125 to 150mm (5 to 6") Port Size

CK-5 125 to 150mm (5 to 6") Material List

Item	Description	Material	Qty
1	Seal Cap, Pressure Pilot	Aluminum 2011-T3	1
2	Gasket, Seal Cap, Pressure Pilot	Nylon	1
3	Nut, Packing, Pressure Pilot	303 S.S.	1
4	Packing, Stem, Pressure Pilot	Crane Foil	1
5	Washer, Packing, Pressure Pilot	Teflon, Carbon	1
6	Stem, Pressure Pilot	303 S.S.	1
7	Bonnet, Pressure Pilot	Cast Iron	1
8	Screw, Pressure Pilot HEX HD 5/16-18X7/8L	Steel Grade 5 Zinc	8
9	Plate, Spring, Upper, Pressure Pilot	Carbon Steel	1
10	Spring, Range A, Pressure Pilot	ASTM A401	1
11	Plate, Spring, Lower, Pressure Pilot	Carbon Steel	1
12	Follower, Diaphragm, Pressure Pilot	Carbon Steel	1
13	Gasket, Diaphragm, Pressure Pilot	Garlock 2930 Non-asbestos	1
14	Diaphragm, Pressure Pilot	Stainless Steel	1
15	Seat, Pressure Pilot	303SS ASTM A582	1
16	Screw, Adapter CK-5, 125 mm (5") BLT,HEX HD 5/8 -11X2-1/4L	Steel Grade 5 Zinc	8
	Screw, Adapter CK-5, 150 mm (6") BLT,HEX HD 3/4-10X2-3/4L		10
17	Gasket, Bonnet	Garlock 2930 Non-asbestos	1
18	Name Plate, CK-5	Aluminum	1
19	Plug for Gauge, 3/8" NPT, CK-5	Steel, Zinc Plate	1
20	Adapter, CK-5	1018 Steel	1
21	Gasket, Adapter, CK-5	Garlock 2930 Non-asbestos	1
22	Piston, Plug, CK-5	Ductile Iron ASTM A-536	1
23	Body CK-5	Gray Cast Iron	1
24	Gasket, Flange, CK-5	Garlock 2930 Non-asbestos	2
25	Flange, CK-5	ASTM A-105	2
26	Nut Flange, CK-5 Body	Steel	16
27	Bolt Flange, CK-5 Body SQ HD 3/4 -10X4-1/2L	ASTM A 307 GR A	16
28	Spring, Manual Opening, CK-5	ASTM A229	1
29	Stem, Manual Opening, CK-5	416 SS	1
30	Gasket, Cover Bottom, CK-5	Garlock 2930 Non-asbestos	1
31	Bottom Cover, CK-5	Ductile Iron	1
32	Bolts, Bottom Cover, CK-5 125 mm (5") HEX HD 5/8 -11X2L	Steel GR 5 Zinc	6
	Bolts, Bottom Cover, CK-5 150 mm (6") HEX HD 3/4 -10X2-1/4L		8
33	Washer, Flat, Bottom CK-5	Soft AISI 1010 Carbon Steel	1
34	Packing, Stem, CK-5	ASTM F2168	1
35	Nut, Packing, CK-5	416 SS	1
36	Gasket, Seal Cap, Bottom CK-5	Nylon	1
37	Seal Cap, Bottom CK-5	Aluminum 2011-T3	1
38	Pipe, Nipple 3/8" x 2L, CK-5	1117 Steel	1
39	Nut, Disc Strainer, CK-5	416 SS	2
40	Flange, Disc Strainer, CK-5	ASTM A-105	2
41	Gasket, Disc Strainer, CK-5	Garlock 2930 Non-asbestos	2
42	Strainer, Disc, 60 mesh, CK-5	Carbon 1213/1215	1
43	Bolt, Disc Strainer 7/16" - 14 x 2- 1/2" L	Steel Grade 5 Zinc	2
44L	LED Knob Kit, S8F Coil	—	1
44S	Standard Knob Kit, S8F Coil	—	1

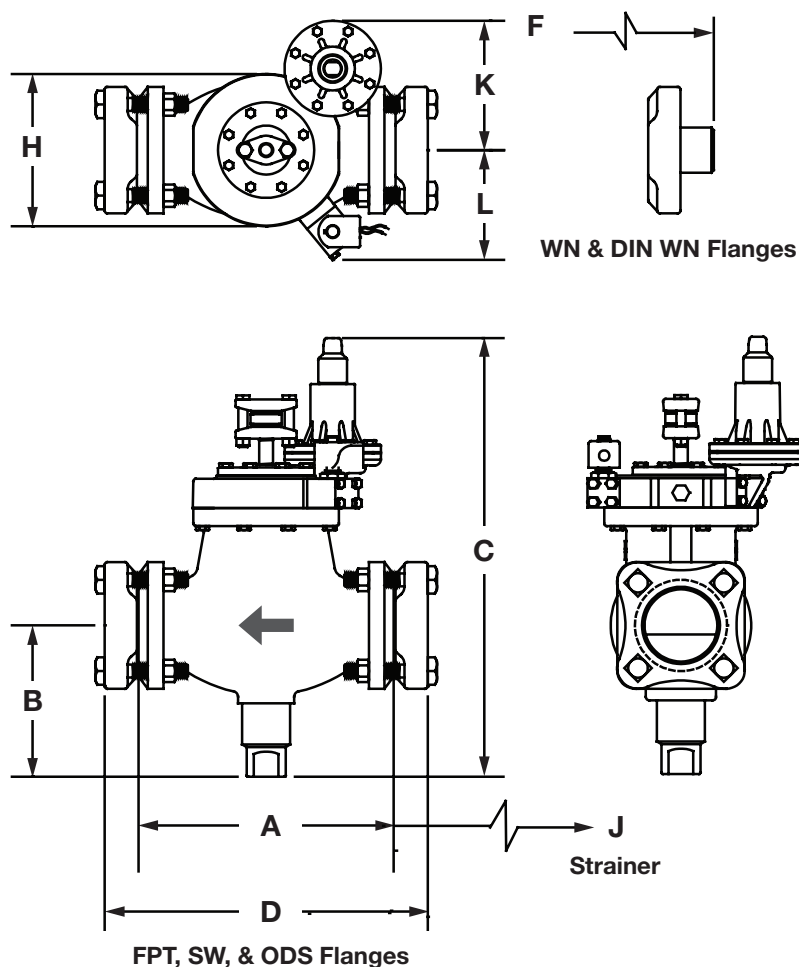
Item	Description	Material	Qty
45	O-ring, S8F Coil	Ethylene Propylene	1
46	Coil for S8F	Encapsulated	1
47	Nut, Solenoid Tube S8F	Steel AISI 1010 or AISI 12L14	1
48	Solenoid Tube S8F, AC Coils	304 S.S.	1
49	Gasket, Tube S8F	Wolverine	1
50A	Plunger/Needle Assembly S8F, VAC Coils	Silicon Iron B Steel	1
50D	Plunger/Needle Assembly S8F, VDC Coils	Silicon Iron B Steel	1
51	Piston Plug Assembly S8F	AISI 1213/1215 C.R.S/Teflon	1
52	Nut Flange, S8F Body	Steel	2
53	Flange, Body S8F	ASTM A105	2
54	Gasket Flange, Body S8F	Garlock 2930 Non-asbestos	2
55	Body, S8F Solenoid Pilot	Ductil Iron ASTM A536	1
56	Name Plate, S8F	Aluminum	1
57	Bolt Flange, S8F Body	Steel Grade 5 Zinc	2
58	Stem, Manual Opening S8F	416 S.S.	1
59	Washer, Flat, S8F	H.R. or C.R. Steel	1
60	Packing, Stem S8F	ASTM F2168	1
61	Nut, Packing S8F	AISI 1213/1215 C.R.S	1
62	O-ring, Seal Cap Bottom S8F	Neoprene	1
63	Seal Cap S8F	Valox 420 Black	1

CK-5 125 to 150mm (5 to 6") Replacement Part Kits				
Item	Kit Description		Port Size	
			125 mm (5")	150 mm (6")
1, 2	Seal Cap Kit, Pressure Pilot		201110	
2 (12)	Gasket Pkg, Seal Cap, Pressure Pilot		202408	
3-5	Packing kit, Stem, Pressure Pilot		202100	
4 (25)	Stem Packing, Pkg, Pressure Pilot		202478	
4-6	Stem Kit, Pressure Pilot		202120	
8 (8)	Bolt Pkg. Pressure Pilot		202246	
3-6, 9-12	Spring/Stem Kit, Pressure Pilot		202006	
9-11, 13	Spring Kit, Range A, Pressure Pilot		202481	
13, 14, 17	Diaphragm Kit, Pressure Pilot		200770	
13-15, 17	Seat/Diaphragm Kit, Range A, Pressure Pilot		202001	
1-13	Bonnet/Spring Kit, Range A, Pressure Pilot		202008	
16	Bolt, Adapter CK-5		Consult factory	
17, 19, 20, 21	Adapter Kit, CK-5		204753	204754
17, 21	Gasket Kit, Adapter CK-5		Consult factory	
21, 22	Piston Kit, CK-5		204759	204758
24	Gasket Pkg. Flange, CK-5 Body		202085	202086
25 (2)	Flange, CK-5 Body	SW	200070	200074
		SW ANSI	200072	200076
		WN	200071	200075
26 (16), 27 (16)	Bolt Pkg. Flange, CK-5 Body		202262	
28	Spring Kit, CK-5		301511	301534
29, 30, 33-35	Stem Kit, CK-5		202363	202364
30-31, 33-35	Bottom Cover Kit, CK-5		200724	200755
32	Bolt, Bottom Cover, CK-5		202250	202539
33-35	Packing Kit, Manual Opening Stem CK-5		202101	
36-37	Cap Kit, CK-5		202111	
41(2), 42	Strainer Kit, Disc		200912	
39 (2), 43 (2)	Bolts and Nuts, Disc Strainer		201580	
38-43	Strainer Kit, Disc with Flanges, Bolts, Nuts, and Gaskets	10mm (3/8") FPT	201665	
		10mm (3/8") SW	201704	
		13mm (1/2") FPT	201706	
		13mm (1/2") SW	201707	
		20mm (3/4") SW	201710	
44S, 45	Knob kit, S8F Solenoid (no LED)		205237	
44L, 45	LED Knob Kit, S8F Solenoid	Green	208543	
		Red	208544	
46	Coil, S6A		Refer to current price list ILP- to get the coil part number according to voltage and frequency	
47-49	Tube Kit, Solenoid S8F		209320	
49, 50A	Plunger Kit, Needle, S8F VAC		201019	
49, 50D	Plunger Kit, Needle, S8F VDC		201021	
49, 51	Plunger Kit, Piston S8F		251387	
49, 50A, 51	Plunger Piston Kit, S8F VAC		202072	
52 (2), 57 (2)	Bolt Kit, for S8F body and flanges		201579	
	Bolt Kit, for S8F body, strainer and flanges		201576	

CK-5 125 to 150mm (5 to 6") Replacement Part Kits (Cont.)				
Item	Kit Description		Port Size	
			125 mm (5")	150 mm (6")
53 (2)	Male Flanges Kit, per S8F Valve	10mm (3/8") FPT	200001	
		10mm (3/8") SW	200005	
		10mm (3/8") WN	200009	
		13mm (1/2") FPT	200002	
		13mm (1/2") SW	200006	
		13mm (1/2") WN	200010	
		20mm (3/4") FPT	200003	
		20mm (3/4") SW	200007	
		20mm (3/4") WN	200011	
54 (12)	Gasket Kit, Flange S8F		202078	
58-61	Stem Kit, Opening S8F		202238	
62-63	Seal Cap, S8F		209916	
47-50A, 51, 55-56, 58-63	Complete Valve Body Assembly, S8F VAC		100997	
47-50D, 51, 55-56, 58-63	Complete Valve Body Assembly, S8F VDC		102031	

Dimensions

CK-5 Valve Dimensions 32mm to 100mm (1-1/4" to 4") Port Size



Clearance Zone:

1. The top of the CK-5 32mm to 100mm (1-1/4" to 4") requires a clearance of 76 mm (3") for the removal of the disc strainer, operation of pilot regulator.
2. The bottom of the CK-5 valve requires a clearance of 102 mm (4") for the removal of bottom cover.
3. Both the left and right side of the CK-5 valve requires a minimum of 76 mm (3") on each side.

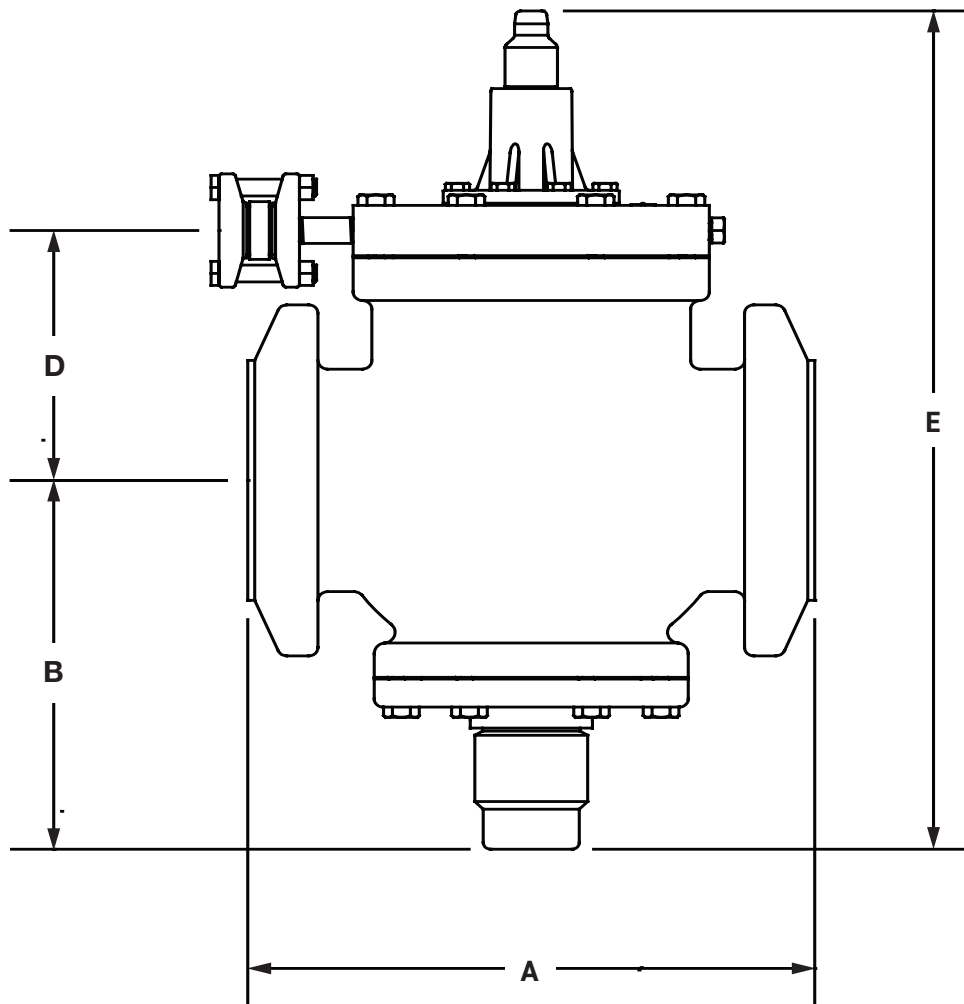
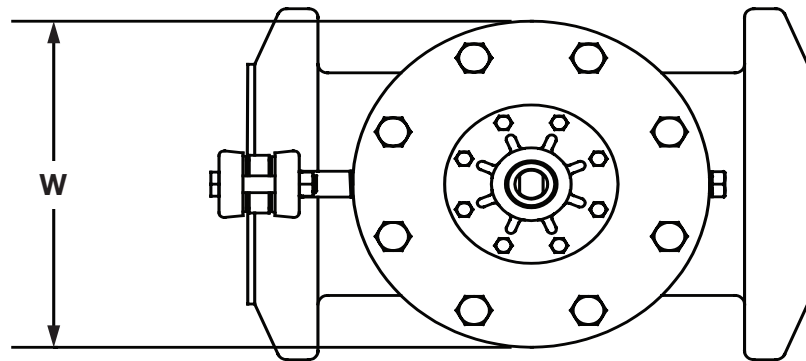
Port Size		A		B*		C		H		J		K		L	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
32	1¼	203.2	8.0	119.5	4.7	403.6	15.9	117.5	4.6	178.0	7.0	137.0	5.4	106.1	4.2
40 - 50	1⅝ - 2	250.8	9.9	133.7	5.3	457.2	18.0	144.5	5.7	251.0	9.9	143.1	5.6	112.3	4.4
65	2½	252.4	9.9	142.4	5.6	480.1	18.9	160.3	6.3	315.0	12.4	151.9	6.0	121.1	4.8
75	3	311.2	12.3	211.1	8.3	564.3	22.2	188.1	7.4	315.0	12.4	167.9	6.6	135.6	5.3
100	4	358.8	14.1	214.3	8.4	605.0	23.8	222.2	8.8	363.0	14.3	188.5	7.4	156.2	6.2

* Allow 25mm (1") below valve to operate manual opening stem

Port Size		D						F					
		FPT*, SW			ODS			WN			DIN WN		
mm	inch	Connection	mm	inch	Connection	mm	inch	Connection	mm	inch	Connection	mm	inch
32	1¼	1¼"	254.0	10.0	1⅝"	254.0	10.0	1¼"	325.1	12.8	32mm	304.8	12.0
		1½"						1½"	312.4	12.3	38mm	312.4	12.3
40 - 50	1⅝ - 2	1½"	307.3	12.1	2⅛"	307.3	12.1	1½"	365.8	14.4	38mm	365.8	14.4
		2"			2⅝"			2"	378.5	14.9	50mm	370.8	14.6
65	2½	2½"	317.5	12.5	2⅝"	317.5	12.5	2½"	388.6	15.3	65mm	388.6	15.3
		3"			3⅛"			3"	406.4	16.0			
75	3	3"	375.9	14.8	3⅛"	375.9	14.8	3"	464.8	18.3	75mm	464.8	18.3
					3⅝"								
100	4	4"	431.8	17.0	4⅞"	431.8	17.0	4"	551.2	21.7	100mm	551.2	21.7

* FPT flanges are only available in 20 - 50mm (¾" - 2")

CK-5 Valve											
Port Size		A		B		D		E		W	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
125	5	393.7	15.5	307.9	12.1	185.3	7.3	653.9	25.7	257.2	10.1
150	6	508.0	20.0	347.6	13.7	264.7	10.4	750.6	29.6	323.9	12.8



Clearance Zone:

1. The top of the CK-5 125mm to 150mm (5" to 6") requires a clearance of 76 mm (3") for the removal of the disc strainer, operation of pilot regulator.
2. The bottom of the CK-5 valve requires a clearance of 102 mm (4") for the removal of bottom cover.
3. Both the left and right side of the CK-5 valve requires a minimum of 76 mm (3") on each side.

Installation

All personnel working on valves must be qualified to work on refrigeration systems. If there are any questions, contact Sporlan Division - Refrigeration Business Unit before proceeding with the installation.

All valves are packed for maximum protection. Unpack carefully, checking to make sure all items are unpacked. Save the enclosed instruction for the installer and eventual user.

△ Do not remove the protective coverings from the inlet and outlet of the valve until the valve is ready to be installed.

Never install the valve with its pilot section directly beneath the main valve. The direct mounted pilot solenoid on the 32mm through 100mm (1-1/4" through 4") port size valves should be maintained above the center line on a horizontal pipe. When used on a suction or wet return line, the arrow on the valve should point in the direction of normal fluid flow. When used on either gas or liquid legs of a flooded evaporator, the arrow on the valve body should point from the evaporator to the surge drum.

Protect inside of valve from dirt and chips during installation. The CK-5 Suction Stop Valve may be installed on its side or vertically upright in either vertical or horizontal pipelines. Figure 5 illustrates the installation of the 32mm through 100mm (1-1/4" through 4") port size valves with a S6B solenoid in a horizontal pipeline. Figure 6 illustrates the installation of the 75mm and 100mm (3" and 4") port size CK-5 stop valves with a S6A solenoid in a vertical pipeline.

Figure 7 illustrates the installation of the 125mm and 150mm (5" and 6") port size CK-5 stop valves in a horizontal pipeline. A bypass equalizing solenoid valve, a requirement with any size CK-5, is also shown. The

remote discharge gas supply solenoid used with the larger 75mm through 150mm (3" through 6") valves, the R/S type S8E, is a gravity closing valve and must be mounted in a horizontal line with its manual opening stem in a vertical position as shown. Never install the valve with its pilot section directly beneath the main valve. The direct mounted pilot solenoid on the 32mm through 100mm (1-1/4" through 4") port size valves should be maintained above the center line on a horizontal pipe.

When used on a suction or wet return line, the arrow on the valve should point in the direction of normal fluid flow. When used on either gas or liquid legs of a flooded evaporator, the arrow on the valve body should point from the evaporator to the surge drum.

Before putting valves into service, all pipe connections, valve seats, bonnet seals, and stem seals should be tested for leaks at pressure levels called for in appropriate codes.

Pressure Pilot Adjustment

The default pressure set point in the pressure pilot is 0.69 bar (10 psi), but the pilot regulator should be adjusted to maintain a minimum set point of about 0.69 bar (10 psi) above the pressure of the defrost relief or equalizing line if it were required. Each 0.69 bar (10 psi) represents approximately 1/2 turn clockwise of the adjusting stem starting with the stem turned completely out.

To increase pressure set point regulator turn the stem in (clockwise). To decrease set point pressure, turn the stem out (counterclockwise).

Manual Opening Operation

All valves contain a manual lift stem. If it is desired to hold open the CK-5 manually, remove Bottom Sealing Cap and turn Seat Lifting Stem inward as far as possible. The valve cannot close now until the Seat Lift Stem is once again turned out.

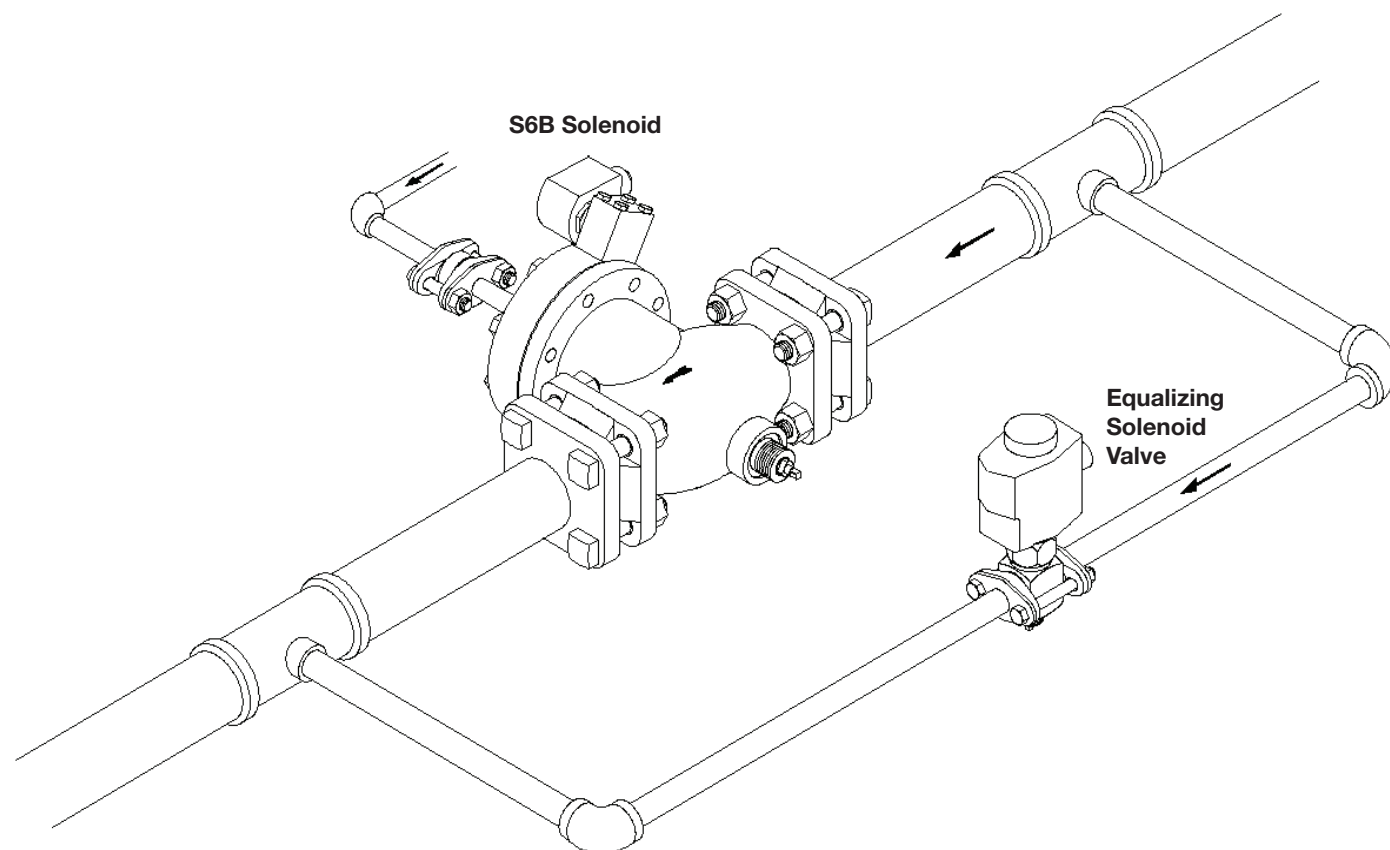


Figure 5: Installation Position (Horizontal) for a CK-5 32mm to 100mm (1-1/4" to 4") Port Size with S6B Solenoid

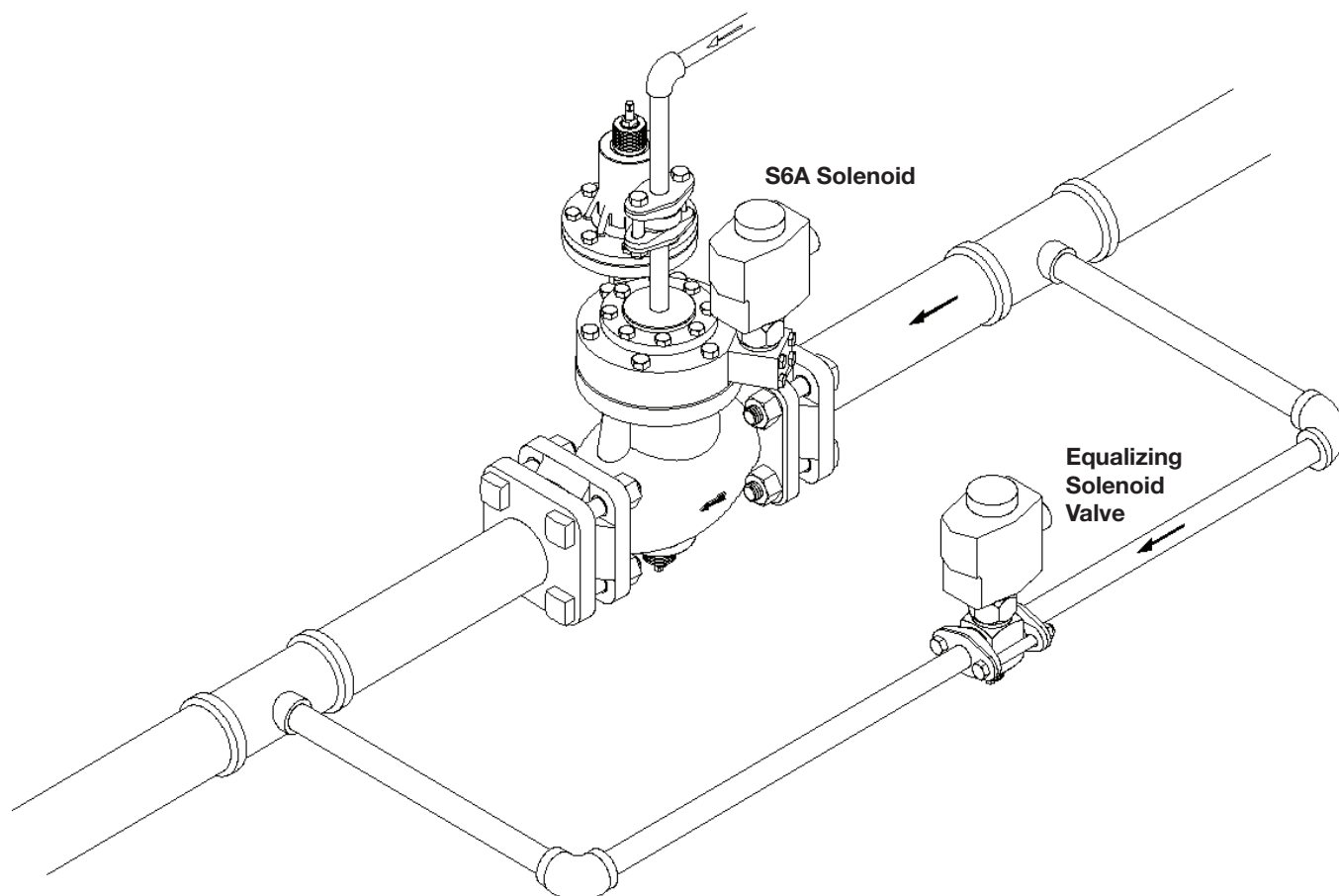


Figure 6: Installation Position (vertical) for a CK-5 75mm to 100mm (3" to 4") Port Size with S6B Solenoid

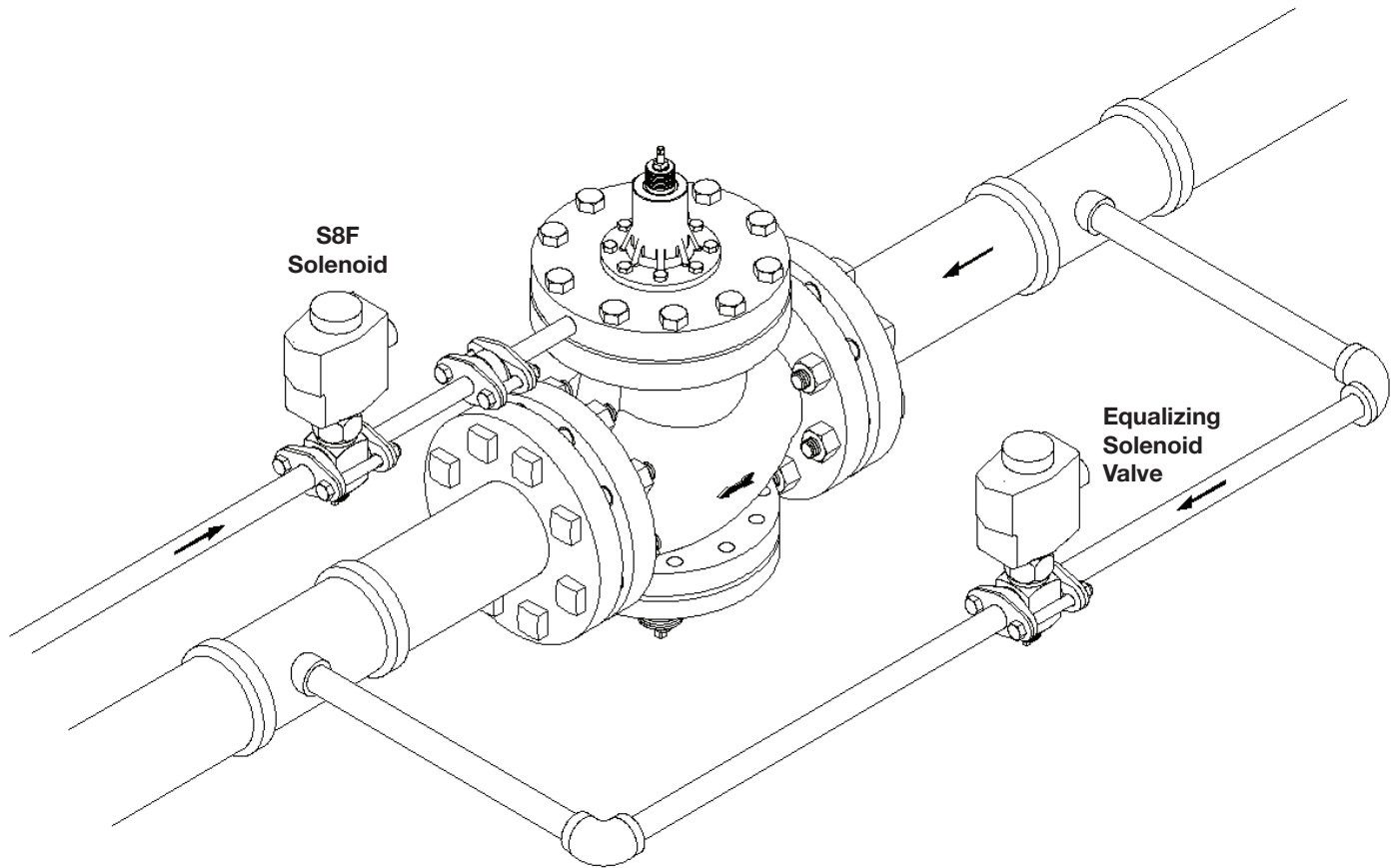


Figure 7: Installation Position (Vertical or Horizontal) for a CK-5 125mm to 150mm (5" to 6") Port Size with S8F Solenoid

Service Pointers

1. Failure to Close: (a) pilot solenoids are not operating due to low voltage or solenoid coil burnout. (b) Dirt lodged between the valve piston and the cylinder wall (disassemble and remove all dirt and burrs). (c) Manual lift stem is turned in, thereby mechanically holding the piston in the open position. (d) Strainer/Disc in the Pilot line, flanges may be plugged (Remove and clean). (e) Pilot pressure source is not high enough; must be at least 0.69 bar (10 psi) above the main valve downstream pressure. (f) Solenoid coils are not being energized in the proper sequence.

2. Failure to Open: (a) Dirt lodged between the valve piston and the cylinder walls (Disassemble and remove dirt and burrs). (b) Main valve spring may be broken (replace spring). (c) Pressures between remote pressure source and main valve downstream pressures are not equalizing. Check for leakage through the pilot solenoids. Check for backward installation of the CK-5 preventing the equalization with downstream pressure. (d) Viscous oil can prevent the valve from opening.

3. Leakage through Valve when Closed: (a) There are dirt or chips under the main valve piston. Disassemble valve and clean thoroughly. (b) Damage to piston plug seat surface or body seat. Replace entire valve piston and lap grind piston face into valve and seat bead if necessary.

CK-5 Valve - Bolt Torque Recommendations					
Port Size		Bolt Size	Item Description	Torque	
mm	inch			N m	ft lb
32 - 150	1¼ - 6	$\frac{5}{16}$ " - 18	Cover Screws	20.3	15
32 - 150	1¼ - 6	$\frac{5}{8}$ " - 11	Adapter Screws	101.7	75
32 - 100	1¼ - 4	$\frac{1}{4}$ " - 20	A2D/S6B/S6A Screws	10.9	8
125 - 150	5 - 6	$\frac{3}{4}$ " - 10	Valve Seat Assembly	101.7	75
10, 13 or 20	$\frac{3}{8}$, ½ or $\frac{3}{4}$	$\frac{7}{16}$ " - 14	Flange Bolt for Disc Strainer	38.0	28
32 - 50	1¼ - 2	$\frac{5}{8}$ " - 11	Flange Bolt	24.3	85
65 - 75	2 ½ - 3	$\frac{3}{4}$ " - 10	Flange Bolt	142.4	105
100	4	$\frac{7}{8}$ " - 9	Flange Bolt	203.4	150
125 - 150	5 - 6	$\frac{3}{4}$ " - 10	Flange Bolt	101.7	75

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Products:	means the Goods, Services and/or Software as described in a Quote.
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Seller:	means Parker-Hannifin Corporation, including all divisions and businesses thereof.
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Software:	means any software related to the Goods, whether embedded or separately downloaded.
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6. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING ANY LOSS OF REVENUE OR PROFITS, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

8. Confidential Information. Buyer acknowledges and agrees that any technical, commercial, or other confidential information of Seller, including, without limitation, pricing, technical drawings or prints and/or part lists, which has been or will be disclosed, delivered or made available, whether directly or indirectly, to Buyer ("Confidential Information"), has been and will be received in confidence and will remain the property of Seller. Buyer further agrees that it will not use Seller's Confidential Information for any purpose other than for the benefit of Seller.

9. Loss to Buyer's Property. Any tools, patterns, materials, equipment or information furnished by

Buyer or which are or become Buyer's property ("Buyer's Property"), will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using Buyer's Property. Furthermore, Seller shall not be responsible for any loss or damage to Buyer's Property while it is in Seller's possession or control.

10. Special Tooling. "Special Tooling" includes but is not limited to tools, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Goods. Seller may impose a tooling charge for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in the Special Tooling, even if such Special Tooling has been specially converted or adapted for manufacture of Goods for Buyer and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property owned by Seller in its sole discretion at any time.

11. Security Interest. To secure payment of all sums due from Buyer, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect Seller's security interest.

12. User Responsibility. Buyer, through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and any technical information provided with the Quote or the Products, such as Seller's instructions, guides and specifications. If Seller provides options of or for Products based upon data or specifications provided by Buyer, Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event Buyer is not the end-user of the Products, Buyer will ensure such end-user complies with this paragraph.

13. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Quote or the Products. **Unauthorized Uses.** If Buyer uses or resells the Products in any way prohibited by Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Further, Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, arising out of or in connection with: (a) improper selection, design, specification, application, or any misuse of Products; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tools, equipment, plans, drawings, designs, specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing, tampering with or repackaging the

Products; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

14. Cancellations and Changes. Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order for any reason except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

15. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller. **16. Force Majeure.** Seller is not liable for delay or failure to perform any of its obligations by reason of events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, delays or failures in delivery from carriers or suppliers, shortages of materials, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by force majeure shall be tolled for the duration of such force majeure and rescheduled for mutually agreed dates as soon as practicable after the force majeure condition ceases to exist. Force majeure shall not include financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or sub-contractors.

17. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidation of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

18. Termination. Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's

property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

19. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

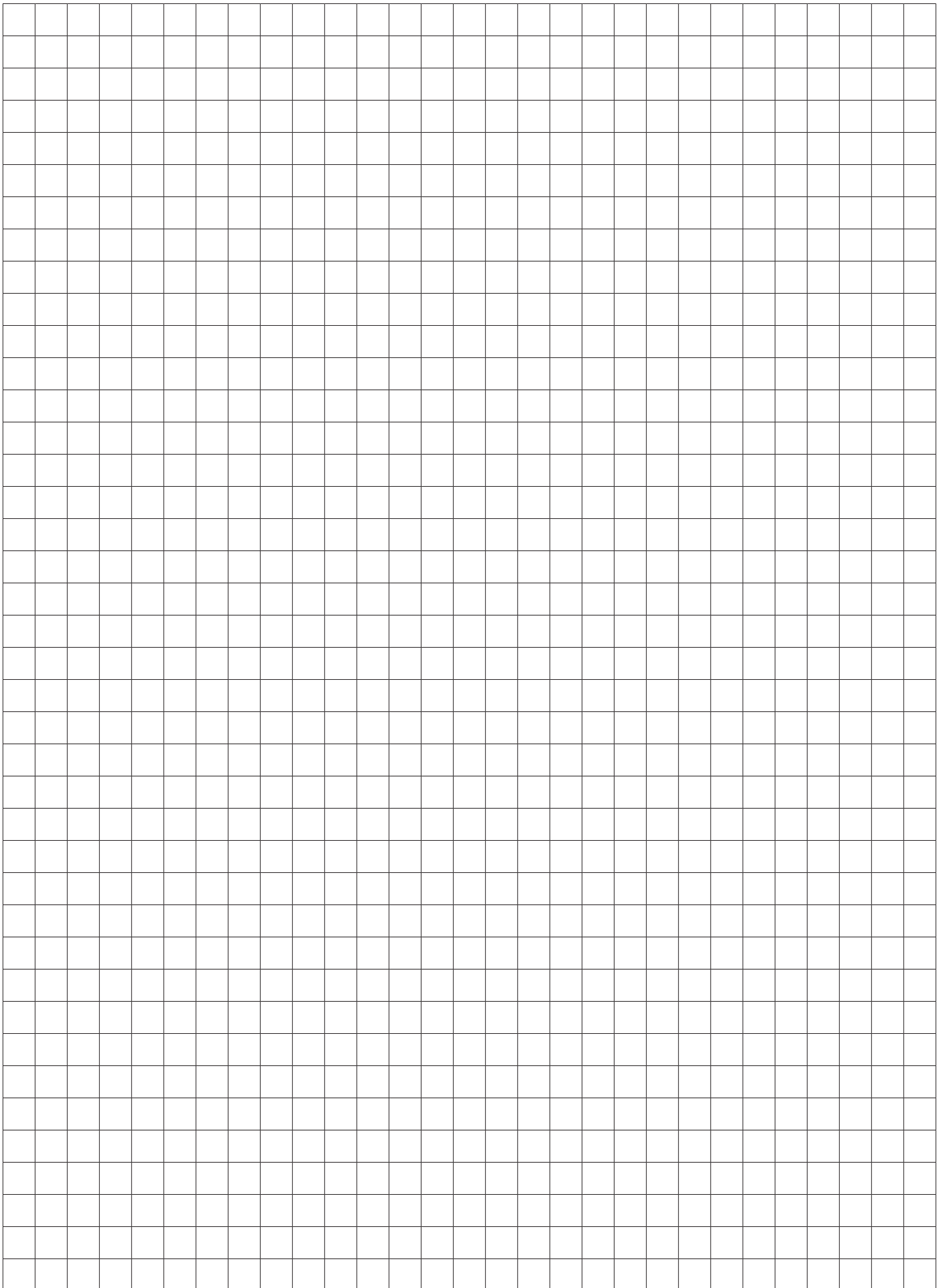
20. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by Seller to Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

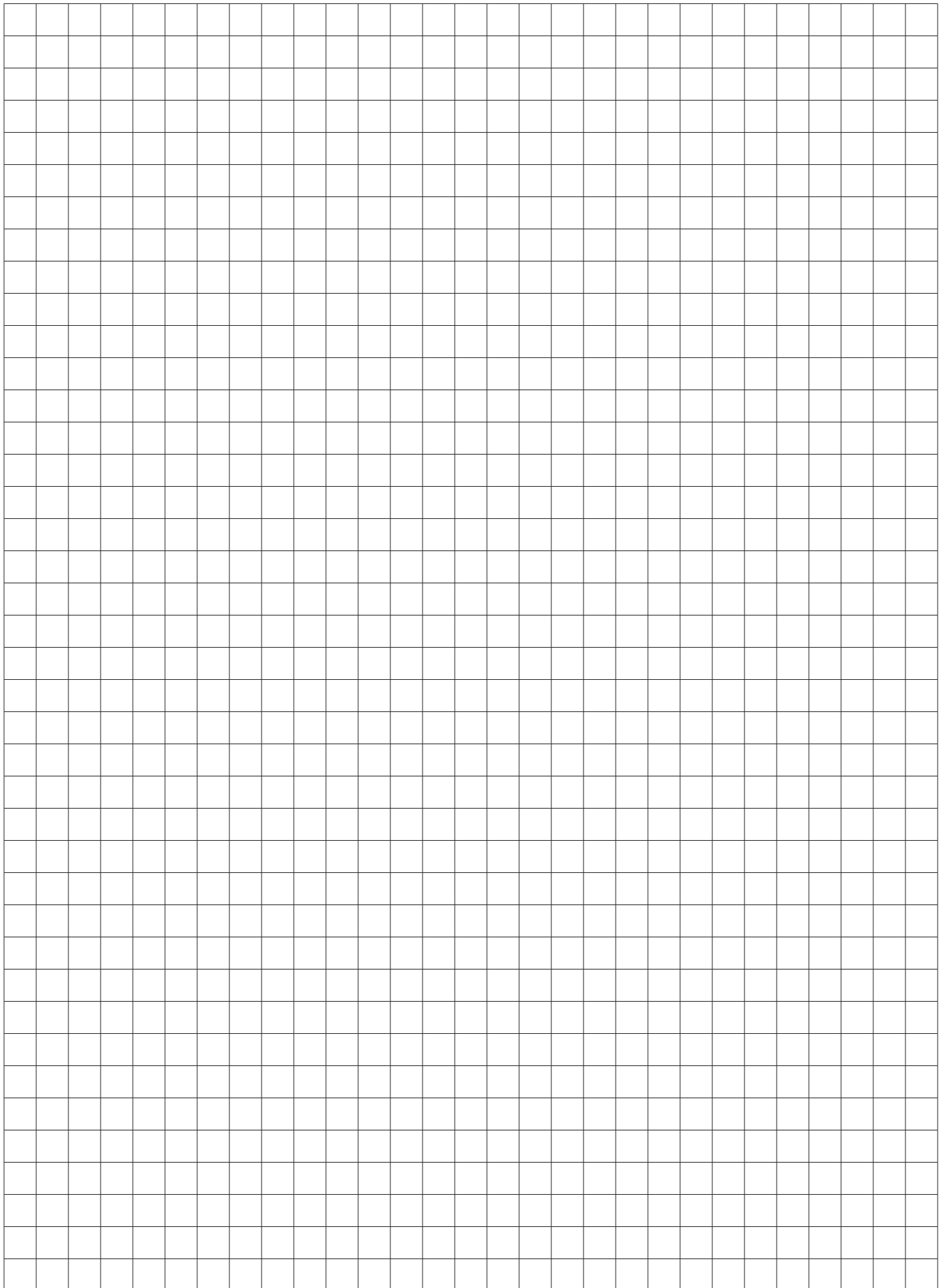
21. Governing Law. These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of

Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

22. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

23. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Laws.





Safe Operation (See Bulletin RSBCV)

People doing any work on a refrigeration system must be qualified and completely familiar with the system and the Refrigerating Specialties Division valves involved, or all other precautions will be meaningless. This includes reading and understanding pertinent Refrigerating Specialties Division Product Bulletins and Safety Bulletin RSB prior to installation or servicing work.

Where cold refrigerant liquid lines are used, it is necessary that certain precautions be taken to avoid damage which could result from liquid expansion. Temperature increases in a piping section full of solid liquid will cause high pressure due to the expanding liquid which can possibly rupture a gasket, pipe or valve. All hand valves isolating such sections should be marked, warning against accidental closing, and must not be closed until the liquid is removed. Check valves must never be installed upstream of solenoid valves, or regulators with electric shut-off, nor should hand valves upstream of solenoid valves or downstream of check valves be closed until the liquid has been removed.

It is advisable to properly install relief devices in any section where liquid expansion could take place. Avoid all piping or control arrangements which might produce thermal or pressure shock.

For the protection of people and products, all refrigerant must be removed from the section to be worked on before a valve, strainer, or other device is opened or removed. Flanges with ODS connections are not suitable for ammonia service.

Warranty

All Refrigerating Specialties products are under warranty against defects in workmanship and materials for a period of one year from date of shipment from factory. This warranty is in force only when products are properly installed, field assembled, maintained, and operated in use and service as specifically stated in Refrigerating Specialties Catalogs or Bulletins for normal refrigeration applications, unless otherwise approved in writing by the Refrigerating Specialties Division. Defective products, or parts thereof returned

to the factory with transportation charges prepaid and found to be defective by factory inspection, will be replaced or repaired at Refrigerating Specialties option, free of charge, F.O.B. factory. Warranty does not cover products which have been altered, or repaired in the field, damaged in transit, or have suffered accidents, misuse, or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

The express warranty set forth above constitutes the only warranty applicable to Refrigerating Specialties products, and is in lieu of all other warranties, expressed or implied, written including any warranty of merchantability, or fitness for a particular purpose. In no event is Refrigerating Specialties responsible for any consequential damages of any nature whatsoever. No employee, agent, dealer or other person is authorized to give any warranties on behalf of Refrigerating Specialties, nor to assume, for Refrigerating Specialties, any other liability in connection with any of its products.

⚠WARNING - USER RESPONSIBILITY

Failure or improper selection or improper use of the products described herein or related items can cause death, personal injury and property damage.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

For safety information see the Safety Guide at www.parker.com/safety or call 1-800-CParker.

